

### **REMARKS**

This application has been reviewed in light of the Final Office Action dated August 15, 2007. This amendment is made to simplify the issues on appeal. In response to the Final Office Action, the following remarks are submitted. Reconsideration of this application, as amended, is requested. Upon entry of the amendment, claims 1-8 will be pending in the Application.

In the Office Action, the Examiner objected to claims 1, 5 and 8 because of various informalities; rejected claims 1-8 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement; rejected claims 1, 5, and 8 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention; objected to the amendment filed May 21, 2007 under 35 U.S.C. 132(a) because it introduces new matter into the disclosure; and indicated claims 1-8 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first and second paragraphs.

### **Claim Objections**

The Examiner objected to claims 1, 5, and 8 for various informalities. In response thereto, applicants have amended claims 1, 5, and 8 to be consistent with the Examiner's recommendations, for more consistency and descriptiveness, and to remove a redundant word, in a manner believed to overcome the objection.

### **35 U.S.C. § 112, First Paragraph**

In Paragraph 5 of the Office Action, the Examiner rejected claims 1-8 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.

The Examiner stated:

Amended claims 1, 5, and 8 claim that the means of control used to control the phase of operation so that the outlet pressure pulse operatively produced by each of the remaining of the at least two compressors is substantially evenly spaced between successive outlet pulses operatively produced by the reference compressor. It is not disclosed in the specification how the phase of operation is controlled or shifted to produce the claimed result. As noted on the Interview Summary mailed on February 23, 2007, the specification describes the components or structure used by the Applicant and the intended results desired by

the Applicant. However, the Applicant does not disclose how to use those components to achieve the stated results in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected to make and/or use the invention. For example, the Applicant discloses that the combination of the controller and inverter is used to change the magnitude of the speed signal sent to the motor to create the phase shift. Then, a sensor senses the actual phase shift. However, it is unclear how such a precise phase shift is accomplished so easily. There is no clear delineation of all the steps necessary to create the phase shift.

Originally, the following was included as part of the 35 U.S.C. 112, paragraph 1 rejection:

Claims 1 and 5 claim a sensing means for sensing the rotational speed and the phase of operation of each of the compressors. The specification discloses a sensor or sensing means for sensing the rotational speed and the phase of operation of each of the compressors (pg. 3, ll. 3-4 and pg 3, para. 7, ll. 6-7). The specification also discloses sensors monitoring refrigerant gas parameters, such as pressure pulses (pg. 4, para. 13, ll. 9-10). It is not clear how the system is sensing the rotational speed and phase as claimed. Instead, it seems more likely that the system is sensing the pressure and calculating the rotational speed and phase of operation of the compressors.

In response, the Applicant added the following language to claims 1 and 5 and new claim 8: determining or configured to determine "the rotational speed and the phase of operation of each compressor of the at least two compressors based on the sensed pressure pulses." The new language was only added to the claims, and the specification contradicts this material in that the specification continuously indicates that a sensor senses the rotational speed and phase of operation of each of the compressors (first mentioned in the specification, pg. 3, ll. 2-3). Prior to the amendment filed on May 21, 2007, no part of the disclosure indicated that the rotational speed and the phases of operation were determined based on the sensed pressure pulses.

For the above reasons, claims 1-8 are not enabled.

Applicants respectfully traverse the Examiner's rejection of claims 1, 5 and 8, under 35 U.S.C. §112, paragraph 1.

"The enablement provision of the Patent Act, 35 U.S.C. §112, paragraph 1, requires that the patentee provide a written description of the invention "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. §112, 1 (2000). The purpose of this requirement is to ensure that 'the public knowledge is enriched by the patent specification to a

degree at least commensurate with the scope of the claims.' Accordingly, ...the specification must provide sufficient teaching such that one skilled in the art could make and use the full scope of the invention without undue experimentation. 'The key word is 'undue,' not 'experimentation.'" Wands, 858 F.2d at 737 (citation omitted). That is, the specification need only teach those aspects of the invention that one skilled in the art could not figure out without undue experimentation. See, e.g., Nat'l Recovery Techs., 166 F.3d at 1196 ("The scope of enablement ... is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation."); Wands, 858 F.2d at 736-37 ("Enablement is not precluded by the necessity for some experimentation such as routine screening."); Warner-Lambert Co. v. Teva Pharmaceuticals USA Inc., 418 F.3d 1326, 75 USPQ2d 1865, (Fed. Cir. 2005) (citations omitted).

First, the Examiner incorrectly states: "Prior to the amendment filed on May 21, 2007, no part of the disclosure indicated that the rotational speed and the phases of operation were determined based on the sensed pressure pulses." In the response to the first office action, Applicants pointed out to the Examiner that paragraph [0013] describes how the phase of operation is controlled or shifted to produce the claimed result. Paragraph [0013] of the specification states in pertinent part:

... Sensors 48, 50 monitor refrigerant gas parameters, such as *pressure pulses*, passing through respective discharge lines 22, 24 providing parameter inputs to a controller 56 via respective lines 58, 60. The controller 56 includes logic devices, such as a microprocessor or other electronic means, for the generation of *speed control signals* 46 and 48 for *controlling the operating parameters of compressors* 12, 14 by controlling their respective inverters 42, 44 and motors 21, 23. AC electrical power received from an electrical power source 40 is rectified from AC to DC, and then inverted from DC back to variable frequency AC by inverters 42, 44 for driving respective compressor motors 21, 23.

[Emphasis added]

The Examiner indicated that "the Applicant discloses that the combination of the controller and inverter is used to change the magnitude of the speed signal sent to the motor to create the phase shift. Then, a sensor senses the actual phase shift. However, it is unclear how such a precise phase shift is accomplished so easily. There is no clear delineation of all the steps necessary to create the phase shift."

The specification indicates throughout that the method employs a continuous feedback from sensors to the controller, for the controller to continuously monitor and change the frequency and voltage applied to compressors. See Specification, paragraph [0016]. The controller 56 monitors the occurrence of pressure pulses from the lead or reference compressor 12 by use of sensor 50. From this information, the controller 56 varies the magnitude of speed control signal 47 which is applied to inverter 44 to synchronize the feedback pressure pulses emanating from the lag compressor 14 via sensor 50 with respect to frequency and simultaneously interleave the pulsations with respect to the phase of the pressure pulsations sensed by sensor 48. Referring to Fig. 2, which depicts the pressure pulses as square waves, wave 52 corresponding to lead compressor 12 pressure pulses and wave 54 corresponding to lag compressor 14 pressure pulses. Preferably, the phase of wave 54 is shifted such that the pulse of wave 54 is positioned substantially equidistant between successive pulses of wave 52. This shifting preferably produces a resultant or effective output wave that is twice the frequency of wave 52 having a wavelength half that of wave 52. See paragraph [0019]. Reference to Figure 2 reveals that the output pressure pulses are respectively spaced with respect to time and pressure, indicating the rotational speed and frequency parameters of the respective compressors.

The description above clearly indicates to one skilled in the art all of the steps necessary to achieve the phase shift, and to produce substantially evenly spaced output pressure pulses. Specifically, by varying the magnitude of the speed control signal to the lag compressor, based on a signal from the pressure pulse sensor to the controller. Since varying the magnitude of the speed control signal applied to the inverter varies the speed of the lag compressor corresponding to the frequency of the pressure pulses, it is clear that varying the speed control signal shifts the phase of the lag compressor pressure pulses relative to the pressure pulses generated by the reference compressor. The Examiner's statement above that it is "not clear how such a precise phase shift is accomplished so easily . . . (and) [t]here is no clear delineation of all the steps necessary to create the phase shift", indicates that the Examiner fails to appreciate that the steps are indeed clearly delineated, and that one skilled in the art would understand that to vary one compressor relative to the other causes the respective output pulses to shift until the feedback controlled parameters are satisfied – i.e., the speed control signal requires no further adjustment. Applicants submit that the disclosure is sufficient to enable one skilled in the art to practice the

invention without undue experimentation, and that there is a "clear delineation of all the steps necessary to create the phase shift."

Therefore, Applicant respectfully submits that claims 1-8, as amended, are now enabled and reconsideration and allowance is requested.

**35 U.S.C. § 112, Second Paragraph**

In Paragraphs 7 and 8 of the Office Action, the Examiner rejected Claims 1, 5, and 8 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Paragraph 8 the Examiner stated:

The term "substantially in claims 1, 5, and 8 is a relative term which renders the claim indefinite. The terms "substantially the same" and "substantially evenly spaced" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Therefore, for purposes of examination the terms "substantially the same" and "substantially evenly spaced" will be interpreted as "the same" and "evenly spaced" respectively.

Applicants respectfully traverse the Examiner's rejection under 35 U.S.C. § 112, Second Paragraph.

MPEP Section 2173.05(b) part D discusses the use of the term "substantially" in a claim:

**D. "Substantially"**

The term "substantially" is often used in conjunction with another term to describe a particular characteristic of the claimed invention. It is a broad term. In *re Nehrenberg*, 280 F.2d 161, 126 USPQ 383 (CCPA 1960). The court held that the limitation "to substantially increase the efficiency of the compound as a copper extractant" was definite in view of the general guidelines contained in the specification. In *re Mattison*, 509 F.2d 563, 184 USPQ 484 (CCPA 1975). The court held that the limitation "which produces substantially equal E and H plane illumination patterns" was definite because one of ordinary skill in the art would know what was meant by "substantially equal." *Andrew Corp. v. Gabriel Electronics*, 847 F.2d 819, 6 USPQ2d 2010 (Fed. Cir. 1988).  
MPEP §2703.05(b) D.

Further, case law provide that "[w]hile reference to intrinsic evidence is primary in interpreting claims, the criterion is the meaning of words as they would be understood by persons in the field of the invention. Patent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be required to be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field. Thus resolution of any ambiguity arising from the claims and specification may be aided by extrinsic evidence of usage and meaning of a term in the context of the invention. The question is not whether the word "substantially" has a fixed meaning ... but how the phrase would be understood by persons experienced in this field of mechanics, upon reading the patent documents.

\* \* \*

Expressions such as "substantially" are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention. Such usage may well satisfy the charge to "particularly point out and distinctly claim" the invention, 35 U.S.C. §112, and indeed may be necessary in order to provide the inventor with the benefit of his invention. In *Andrew Corp. v. Gabriel Elecs. Inc.*, 847 F.2d 819, 821-22, 6 USPQ2d 2010, 2013 (Fed. Cir. 1988) the court explained that usages such as "substantially equal" and "closely approximate" may serve to describe the invention with precision appropriate to the technology and without intruding on the prior art. The court again explained in *Ecolab Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367, 60 USPQ2d 1173, 1179 (Fed. Cir. 2001) that "like the term 'about,' the term 'substantially' is a descriptive term commonly used in patent claims to 'avoid a strict numerical boundary to the specified parameter,'" quoting *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1217, 36 USPQ2d 1225, 1229 (Fed. Cir. 1995).

It is well established that when the term "substantially" serves reasonably to describe the subject matter so that its scope would be understood by persons in the field of the invention, and to distinguish the claimed subject matter from the prior art, it is not indefinite. Understanding of this scope may be derived from extrinsic evidence without rendering the claim invalid. The summary judgment record offered no basis for departing from these general rules. Thus the usage "substantially constant wall thickness" does not of itself render the claims of the '315 patent indefinite.

Verve LLC v. Crane Cams Inc., 65 USPQ2d 1051, 1053 (Fed. Cir. 2002)

As an example, the Examiner cited three references in the First Office Action in this case, including U.S. Pat. No. 5,596,879 issued January 28, 1997, to Burkhardt , et al. (the '879 patent). Claim 1 of the '879 patent includes the limitation " installing a refrigerant line muffler in the refrigerant discharge line at a distance  $n(\lambda/4)$  from the compressor discharge to *thereby substantially eliminate acoustical resonances* downstream from the muffler." [Emphasis added]

Thus, the usage of the word "substantially" would be understood by one skilled in the art to reasonably describe the subject matter of Applicants' invention, and is not indefinite. To the contrary, the scope of a claim using the term "substantially" is understood to those skilled in the art of acoustic vibration.

For the reasons cited above, Applicants believe that the claims are not indefinite, and specifically, that the term "substantially" does not render the claims indefinite for the reasons set forth. Reconsideration and allowance of same are requested.

**35 U.S.C. § 132(a)**

In Paragraph 12 of the Office Action, the Examiner rejected to the amendment filed May 21, 2007 under 35 U.S.C. 132(a) because it introduces new matter into the disclosure.

The Examiner states:

The added material which is not supported by the original disclosure is as follows: determining or configured to determine "the rotational speed and the phase of operation of each compressor of the at least two compressors based on the sensed pressure pulses" (amended claims 1 and 5 and new claim 8). The applicant argues that the above material was added "to clarify that the control means is controlling the rotational speed and the phase of operation of the at least two compressors based on the sensed pressure pulses" (Remarks filed May 21, 2007, p. 9, ll. 28-30). However, this material was only added to the claims, and the specification contradicts this material in that the specification continuously indicates that a sensor senses the rotational speed and phase of operation of each of the compressors (first mentioned in the specification, pg. 3, ll. 2-3). Prior to the amendment filed on May 21, 2007 no part of the disclosure indicated that the rotational speed and the phases of operation were determined based on the sensed pressure pulses.

Applicant is required to cancel the new matter in the reply to this Office Action.

Applicants respectfully traverse the Examiner's rejection under 35 U.S.C. §132(a) for introduction of new matter. For the reasons set forth above with respect to 35 U.S.C. §112, First Paragraph, Applicants submit that the previous amendment to the claims to include "rotational speed and the phase of operation of each compressor of the at least two compressors based on the sensed pressure pulses", is fully supported by the specification and drawings. No new matter was added as a result of the said amendments. Applicants respectfully request that the Examiner's rejection under 35 U.S.C. §132(a) be withdrawn and claims 1- 8 be allowed.

**Allowable Subject Matter**

In Paragraphs 14 and 15 of the Office Action, the Examiner indicated that claims 1-8 would be allowable if rewritten or amended to overcome the rejections(s) under 35 U.S.C. 112, first and second paragraphs, set forth in this Office Action. In response thereto, claims 1, 5 and 8 have been amended in a manner believed to overcome the rejections and are therefore believed to be allowable.

**CONCLUSION**

Applicant believes that the claims as presented are allowable over the rejections and objections raised by the Examiner. Reconsideration and allowance of claims 1-8 is respectfully requested.

This Response has been filed within three (3) months of the mailing date of the Final Office Action and it is believed that no fees are due with the filing of this paper. In the event that Applicants are mistaken in their calculations, the Commissioner is hereby authorized to deduct any fees determined by the Patent Office to be due from the undersigned's Deposit Account No. 50-1059.

The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit Account No. 50-1059.

Respectfully submitted,

Dated: November 15, 2007

/s/William P. Smith  
William P. Smith  
Reg. No. 34,931

McNees Wallace & Nurick  
100 Pine Street  
P.O. Box 1166  
Harrisburg, Pa 17108-1166  
Phone: 717-237-5260  
Fax: 717-260-1745  
Attorney for Applicant